BRACHIOPPIELLA SPECIES (ACARI: ORIBATIDA: OPPIIDAE) FROM SOUTH AUSTRALIAN SOILS

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As part of a study of oribate mites from South Australian soils, the genus *Brachioppiella* Hammer, 1962 is reviewed and the following four new species are described: *Brachioppiella* (*Brachioppiella*) *paranasalis*, *Brachioppiella* (*Gressittoppia*) *magna*, *B.* (*G.*) *minima*, *B.* (*G.*) *pseudohigginsi*. Brachioppiinae Subias, 1989 is commented on and a key to the adults of all Australian genera, subgenera and species is provided.

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As a result of studies done in South Australia on the advanced oribate mites (Planofissurae, see Lee (1987)) of soils, numerous adults belonging to the family Oppiidae Grandjean, 1951 were extracted. Amongst them, the subfamily Brachioppiinae Subias, 1989 in Subias & P. Balogh (1989) were only represented by members of the genus *Brachioppiella* Hammer, 1962. These are described here using the notation and systematic framework (as implied by the taxon definitions and keys) of Subias & Balogh (1989). The Brachioppiinae are commented on and, because some of the included genera are very similar to *Brachioppiella*, keys are provided for all the Australian taxa.

Information on all the nine florally diverse sites which were sampled is given by Lee (1981), *Brachioppiella* having been collected from only four of these sites. Measurements are in micrometres (μm). All the material was collected by one of us (D.C.L.). The specimens are mostly deposited in the South Australian Museum (SAMA), but also in the Faculty of Biology of the Universidad Complutense of Madrid (FBUCM), the Field Museum of Natural History, Chicago (FMNH) or the New Zealand Arthropod Collection, D.S.I.R., Auckland (NZAC).

SYSTEMATICS

Brachioppiinae Subias

Brachioppiinae Subias in Subias & P. Balogh, 1989: p. 370.

Diagnosis (Adults)

Oppiidae. Genital and anal plates usually normal length and well separated. Epimeres III and IV not usually reaching behind genital plates, but if they do, then apodemes IV present. Crista notogastra absent. Seta *c*2 absent or less developed than other notogastral setae. Interbothridial tubercles usually absent. Anterior margin of notogaster lacks both protruding humeral processes and interbothridial costula. Lamellar and/or translamellar lines present. Fissurae *iad* inverse apoanal. Sensillus either pectinate, radiate or ciliate.

Distribution

The Brachioppiinae are restricted to the major southern regions (Neotropical, Ethiopian, Oriental, Australasian, Subantarctic and Antarctic). Few records are from the Northern Hemisphere or the tropics. Mostly the species are from moist southern temperate locations, indicating a Gondwanan distribution.

Within Australia all the records are from outside the tropics, either from Queensland, New South Wales or South Australia. The Queensland records are from dry or wet sclerophyll forest, the New South Wales records are from subtropical rainforest, whilst the South Australian records are from dry sclerophyll or cultivated pine forest, or from woodland or closed scrubland with a substantial litter layer. None of the records are from the extensive drier Australian regions with open vegetation and sparse litter.

Remarks

The Brachioppiinae include genera which were placed in five separate subfamilies in the classification of J. Balogh (1983). It is particularly similar to three subfamilies (Arcoppiinae J. Balogh, 1983, Lanceoppiinae J. Balogh, 1983 and Oppiinae Grandjean, 1951) amongst these five subfamilies, which lack protruding humeral notogastral processes. It is also very similar to the Multioppiinae J. Balogh, 1983. In distinguishing Brachioppiellinae from these four subfamilies, four characters are important: the shape of the sensillus, the presence or absence of prodorsal lines, the number of genital setae and the position of the paranal fissurae (*iad*). This last diagnostic character excludes *Gressittoppia luxtoni* Ayyildiz, 1989, a species superficially very similar to members of the Brachioppiinae, to be grouped in the Multioppiinae.

In the distinguishing of brachioppiine genera, the number of genital setae is given considerable value. Whilst this is considered reliable in classifying species with six pairs as compared with fewer pairs (as it also is in distinguishing the subfamily Arcoppiinae from the Multioppiinae), the differentiating of species with either four or five pairs into separate genera is sometimes considered unreliable. The unreliability is demonstrated by *Brachioppiella* (*Gressittoppia*) *magna* in this paper, since it usually has four pairs, but on only one female there are five pairs of genital setae. Despite this, four as opposed to five genital setae is still used, as by Subias & P. Balogh (1989), in order to recognise the subgenera of *Brachioppiella*, although it is pointed out under the remarks on *B.* (*Gressittoppia*) that this division into subgenera may not be valid.

The following five genera or subgenera are known from Australia: *Brachioppiella* (*Brachioppiella*) Hammer, 1962; *Brachioppiella* (*Gressittoppia*) Balogh, 1983 (here recorded from Australia for the first time); *Brassoppia* (*Brassoppia*) Balogh, 1983; *Ctenoppia* Balogh, 1983; *Kokoppia* Balogh, 1983.

KEY TO AUSTRALIAN BRACHIOPPIINAE (Adults)

1 — Sensillus large, length more than distance between it and rostral setae. Prodorsum large, length more than 0.66 × length of notogaster. . . . *Ctenoppia* Balogh 2

— Sensillus medium length, less than 0.75 × distance between it and rostral setae. Prodorsum size normal, length less than 0.66 × length of notogaster. 3

2 — Notogastral setae long (*e.g.* length of seta *la* more than 1.5 × distance between *la*–*lm*). . . . . *Ctenoppia variopectinata* Balogh & Mahunka, 1975

— Notogastral setae short (*e.g.* length of seta *la* less than 0.66 × distance between *la*–*lm*. . . . . *Ctenoppia eupectinata* Balogh & Mahunka, 1975

3 — Six pairs of genital setae. Prodorsal quadrangular field undelineated except for four small convex protruberances along posterior margin. Notogastral seta *c*2 present, small (length more than 2 × diameter of alveolus). . . . . *Kokoppia dudichi* (Balogh, 1982)

— Four or five pairs of genital setae. Prodorsal quadrangular field usually partially delineated by translamellar line; if undelineated, then notogastral seta *c*2 represented only by alveolus. 4

4 — Four pairs of genital setae. Prodorsal quadrangular field delineated anteriorly (translamella) and laterally (lamella) by low crest, and posteriorly by faint, transverse line. Notogastral seta *c*2 present, small (length more than 2 × diameter of alveolus). . . . . *Brassoppia brassi* (Balogh, 1982)

— Four or five pairs of genital setae. Prodorsal quadrangular field delineated anteriorly (translamella) and anterolaterally (lamella) by lines, and posteriorly with alveolate protruberance between setae *j*2–*j*2. Notogastral seta *c*2 present as microseta (length less than 2 × diameter of alveolus) or represented only by alveolus. 5

5 — Five pairs of genital setae. . . . . . . *Brachioppiella* (*Brachioppiella*) 6

— Four pairs of genital setae normal for a species. *Brachioppiella* (*Gressittoppia*). 7

6 — Notogastral seta *lm* posterior to *la*, distance apart subequal to distance between *lm*–*lp*. Sensillus caput slim (about 2 × breadth of stalk) with three or four cilia. Somal length, 425–440. . . . . *B.* (*B.*) *biseriata* (Balogh and Mahunka, 1975)

— Notogastral seta *lm* level with and adaxial to *la*, distance apart less than 0.5 x distance between *lm*–*lp*. Sensillus caput medium breadth (about 3 × breadth of stalk), usually with five cilia, varies from three to seven cilia. Somal length, 290–345. . . . . *B.* (*B.*) *paranasalis* sp. nov.

7 — Apodeme *apo*4 reaching backward beyond level of genital shield. Setae in epimeral file *b* ciliate. Interlamellar seta more than 0.5 × length of lamellar seta. Sensillus with five cilia. Tibia IV slim (greatest breadth about 0.25 × length), seta *av* ensiform, long (length more than 2 x breadth of tibia). Somal length, 360–520. . . . . *B.* (*G.*) *magna* sp. nov.

— Apodeme *apo*4 reaching back only to middle of genital shield. Setae in epimeral file *b* smooth. Interlamellar seta less than 0.5 × length of lamellar seta. Sensillus with six or seven cilia. Tibia IV not slim (greatest breadth about 0.33 × length), seta *av* setose or ensiform, medium length (length subequal to breadth of tibia). Somal length less than 300. 8

8 — Notogastral seta *lm* nearer *lp* than *la*. No apodeme between *ep*2, epimeral *apo*2 not continuous across midline. Tibia IV with clearly delineated caput bearing setose ventral setae. Somal length, 185–220. . . . . *B.* (*G.*) *minima* sp. nov.

— Notogastral seta *lm* nearer *la* than *lp*. Apodeme between *ep*2, epimeral *apo*2 continuous across midline. Tibia IV with indistinct caput/stalk margin, bearing ensiform ventral setae. Somal length, 275–295. . . . . *B.* (*G.*) *pseudohigginsi* sp. nov.

Genus **Brachioppiella** Hammer

Brachioppiella Hammer, 1962: p. 47.
Type-species (by original designation): *Brachioppiella periculosa* Hammer, 1962.

Diagnosis (Adults)

Brachioppiinae. Sensillus pectinate with single file of long cilia either on fusiform or setiform caput. Rostral setae separated by distance more than 4 × diameter of one of their alveoli. Interlamellar seta present. Lamellar seta closer to interlamellar seta than rostral seta. Rostrum not incised. Costula (but lamellar line may be present) and crista absent. Ten pairs notogastral setae, seta *c*2 vestigial (either microseta, length less than twice alveolus diameter, or just alveolus). Apodeme IV present. Four or five pairs of genital setae. Ventral seta *ad*1 postanal, *ad*3 preanal. Pore *iad* inverse apoanal. Tarsus IV with two ensiform anteroventral setae and two ciliate cuneiform posteroventral setae.

Morphology of Australian species

The prodorsum has a plateau-like quadrangular field around the lamellar and interlamellar setae. It is usually delineated (exception — *Brachioppiella biseriata* Balogh & Mahunka, 1975) anteriorly by a translamellar line (in lateral view can be seen to be a sulculus, which may be substantial but inconspicuous when seen from above, with edges that are recognisable as two parallel fine lines), whilst laterally it is bordered by a granulate slope which anteriorly forms a lamellar line (there are no costulate ridges), and posteriorly there is a protruberance between the interlamellar setae with alveolate sculpturing. There is a lateral row of large alveoli, and around the exobothridial seta the integument is granulate. The sensillus is not longer than the distance from its partner and the pectinate caput can be slim (as *Brachioppiella biseriata*, with width less than twice that of proximal stalk), broad or swollen. The notogaster shows little variation, except in setal length (large setae may have cilia and seta *c*2 may or may not be detectable) and in the position of seta *lm* relative to seta *la*. The venter has strong epimeral apodemes with weak superficial sculpturing forming shallow alveoli on the epimeres. The longer lateral epimeral setae may be ciliate. The most conspicuous varying characters are the number of genital setae, the position of apodeme IV and the presence or absence of an apodeme between epimeres 2. The size of the genital shields is sexually dimorphic, being larger on the female (Fig. 2) and smaller on the male (Fig. 8). No eggs were noted in any females collected in this study. Trochanter III has a transverse proximodorsal ridge with spurs at both ends. All the tibiae have a long flagelliform solenidium (*cf. Brachioppia cuscensis* Hammer, 1961, type-species, which has a short fat solenidium on tibia II). In all but the small *Brachioppiella minima* sp. nov., the tibiae and tarsi have stout, ensiform ventral spine-like setae, sometimes ciliate, whilst the two proximal shorter posterior spine-like setae on leg IV are ciliate cuneiform, the cilia being merged proximally and spreading out distally into an inverted triangle. Similar distal spreading out of ventral leg setae may be widespread amongst oppiids, and can involve more setae [*e.g. Brachioppiella* (*Gressittoppia*) *orkneyensis* (Kok, 1967) and *Quadroppia quadricarinata* (Michael): Lions 1977]. Somal chaetotaxy: prodorsum — 2, 2, 1; notogaster — 2, 6, 2; epimeres — 3, 1, 3, 3; genital shield — 4 or 5; anal shield — 2; ventral shield — 1, 3.

Distribution

All species of *Brachioppiella* are known only from the major southern regions, mainly in the temperate zone, with a few species from the tropics (see the remarks on the subgenus *Brachioppiella*), and the subantarctic or antarctic (see the remarks on the subgenus *Gressittoppia*).

Amongst the nine florally diverse sites sampled in South Australia, the greatest numbers of three of the four species of *Brachioppiella* were found at the dry sclerophyll forest site on Mt Lofty, which has the highest rainfall (mainly in winter, being a Mediterranean-type climate) of any site. One of these species, *B.* (*Gressittoppia*) *minima* sp. nov., also occurs in small numbers at two nearby sites in the Mt Lofty Ranges. The fourth species, *B.* (*Gressittoppia*) *pseudohigginsi* sp. nov., is from coastal closed-scrubland, which has a lower rainfall, but is a very moist site, since it is much further south and it is sometimes inundated from a permanent underground stream. The only other known Australian species, *B.* (*Brachioppiella*) *biseriata* (Balogh & Mahunka, 1975), is from dry sclerophyll forest in Queensland.

Remarks

Brachioppiella was placed by J. Balogh (1983) in the subfamily Pulchroppiinae. Later, Subias & P. Balogh (1989) considered that this subfamily should be restricted to *Pulchroppia* Hammer, 1979 and related genera, in which epimeres 3 and 4 are not bordered posteriorly by an apodeme, whilst *Brachioppiella* was the nominotype of a new subfamily. J. Balogh (1983) also established a heterogeneous subfamily, Cycloppiinae, giving considerable weight in the diagnosis to the number of pairs of genital setae. The genus *Gressittoppia* was grouped in Cycloppiinae, because of its four pairs of genital setae, whilst Subias and P. Balogh (1989) considered it to be so closely allied to *Brachioppiella* that it was given the new status of subgenus within that genus. As pointed out here, in the remarks on *B.* (*Gressittoppia*), the two genus group names might be better considered to be synonymous. The only distinguishing character that has been established for the subgenera is the normal number of genital setae. In the case of

Brachioppiella (*Gressittoppia*) *magna* sp. nov. (which on only one specimen has an increased setation from four to five genital pairs), characters are given in the remarks on the species, that distinguish the abnormal specimen from Australian members of the subgenus *Brachioppiella*.

Subgenus **Brachioppiella (Brachioppiella)** Hammer

Diagnosis (Adult)

Brachioppiella. Five pairs of genital setae.

Remarks

The subgenus *Brachioppiella* sens. str. is maintained as by Subias & P. Balogh (1989), delineated from *B.* (*Gressittoppia*) by having five pairs of genital setae. The possiblity that species of *Brachioppiella* should not be grouped into two subgenera is commented on in the 'Remarks' under *Brachioppiella* (*Gressittoppia*).

Brachioppiella (*Brachioppiella*) includes 10 species (Subias & P. Balogh 1989), plus a new species described here from South Australia. The subgenus is widespread in southern temperate regions with a few records from the tropics (New Caledonia, Guinea in West Africa, East Africa). The two Australian species are as follows: *Brachioppiella* (*Brachioppiella*) *biseriata* (Balogh & Mahunka, 1975) and *B.* (*B.*) *paranasalis* sp. nov..

Brachioppiella* (*Brachioppiella*) *paranasalis sp. nov.
(Figs 1, 2 and 9)

Morphology

General appearance and dimensions: Body flattened and widened, brown colour. Idiosomal length: female 320 (39, 308–344); male 309 (44, 290–328). Idiosomal breadth: female 133–143, male 122–135. Leg dimensions for holotype female (length 321): leg lengths (femur-tarsus) I–191, II–145, III–136, IV–180; tibial maximum breadths I–21.5, II–19, III–15.5, IV–15.5.

Prodorsum: Rostrum rounded, unstructured, with rostral setae dorsally ciliate. Quadrangular field with lamellar line restricted to anterior half of distance between lamellar seta and sensillus, whilst translamellar line may be inconspicuous, because although sulculus deep, margins may be unclear in dorsal aspect, and posterior protruberance narrow with two pairs of alveolar, pale patches. Usually three large alveolar, pale patches lateral to quadrangular field. Lamellar, exobothridial and interlamellar setae fine and smooth, decreasing in size in this order, lamellar seta nearly 2 × length of interlamellar seta. Granulated area around exobothridial seta not reaching profile of pedotectum I. Usually five long cilia on caput of sensillus, but varies from three to seven cilia, in single file.

Notogaster: Nine pairs of short to medium length smooth setae, *h2* and *h3* longest, seta *c2* represented only by alveolus with root, but no seta, just behind pore *ia*. Seta *lm* close to and slightly anterior to seta *la*.

Somal venter: Epimeres with weak alveolar sculpturing. In setal file *b*, setae *3b* and *4b* like file *c*, but *1b* similar to file *a* in being smooth and slimmer. Apodeme *apo4* reaching backward to level of mid genital shield. Pedotectum 1 profile smooth, no pedotectum 2, pedotectum 3 large and blunt. Genital setae short and subequal in length. Aggenital seta shorter (0.6 ×) than adanal seta *ad3*.

Legs: Long (mean femur-tarsus length: 50% of somal length). Legs I and IV longer than other legs, whilst legs I and II are stouter than other legs. Relative breaths of tibiae (maximum height: length): I = 56%, II = 57%, III = 43%, IV = 33%. Ventral setae on tibiae and tarsi often ensiform and ciliate. On tibia and tarsus IV, posteroventral setae shorter than anteroventral setae. Tarsus IV setae *pv1* and *pv2* with single file of cilia longer proximally so that terminating at same level giving seta a cuneiform appearance in posteroventral aspect.

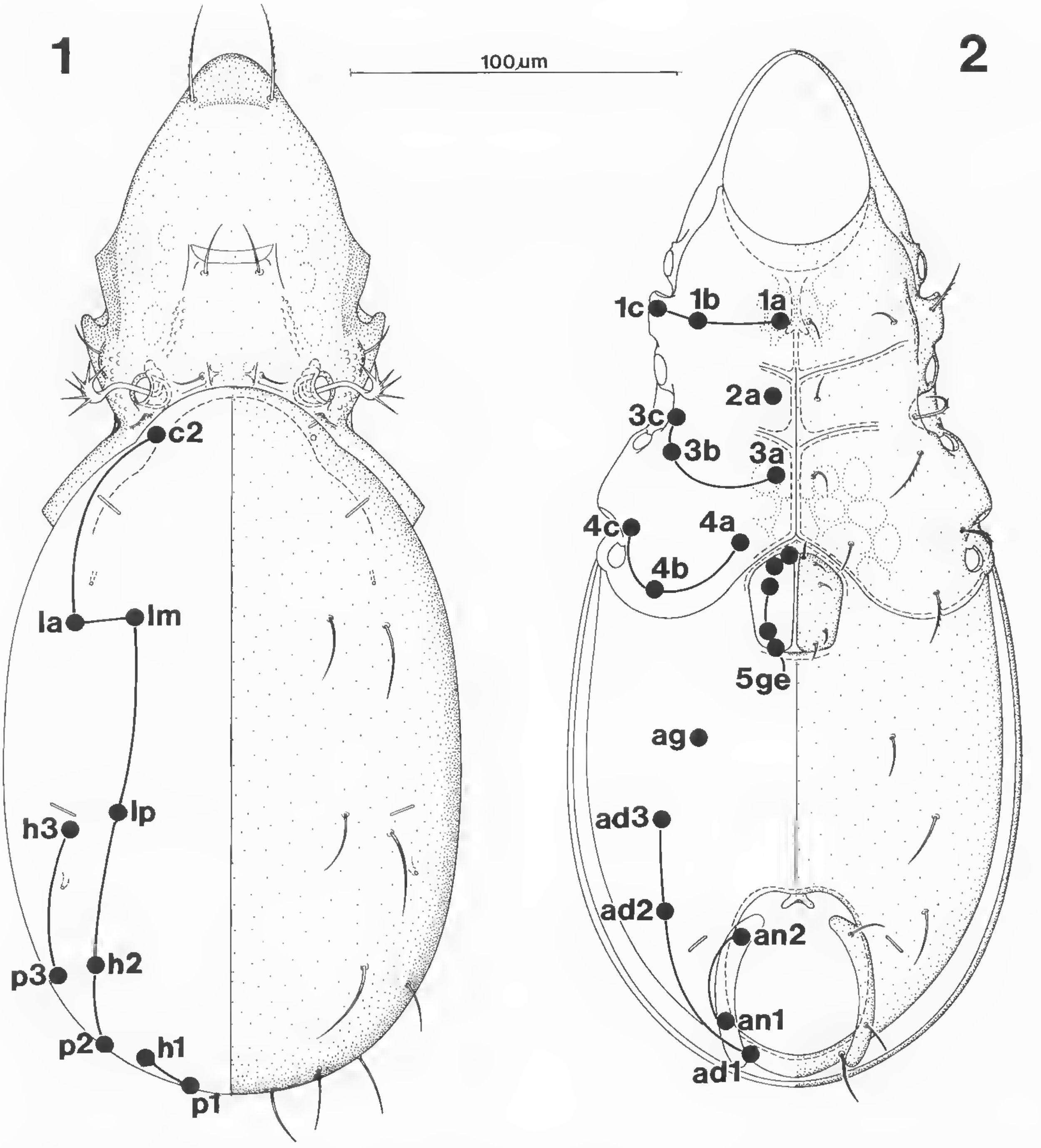
Material examined

Holotype: female (N1989277), plant litter, sparse moss and sandy soil, under sclerophyllous shrubs amongst messmate stringybark (*Eucalyptus obliqua*), dry sclerophyll forest, near summit of Mt Lofty (34°9′S, 138°5′E), Cleland Conservation Park, 9.v.1974.

Paratypes: 26 females (N1989278-N1989303) and 30 males (N1989304-N1989333); 2 females and 3 males (FBUCM); 2 females and 2 males (FMNH); 2 females and 2 males (NZAC); 6 females and 7 males lost; same data as holotype.

Remarks

Brachioppiella (*Brachioppiella*) *paranasalis* is easily distinguished from known Australian species of *Brachioppiella* by having notogastral seta *lm* transposed anteriorly to near *la*. This includes the other member of the subgenus and the larger *Brachioppiella* (*Gressittoppia*) *magna* sp. nov., which in only one of its females examined also has five pairs of genital setae rather than the normal four pairs for *Gressittoppia*. The shape of the sensillus and the nature of the lamella and translamella, in combination with the relative position of notogastral seta *lm* to *la*, distinguishes *B.* (*B.*) *paranasalis* from all known species of *Brachioppiella*, and the position of seta *lm* is only known elsewhere in Australian brachioppielline genera on *Brassoppia brassi* (Balogh, 1982). The



FIGURES 1 AND 2. *Brachioppiella (Brachioppiella) paranasalis* sp. nov., female soma. 1, notum; 2, idiosternum.

species which is most similar, and from which the species name is derived with the Greek prefix *para* meaning 'beside or new', is *Brachioppiella (B.) nasalis* (Evans, 1953), which has notogastral setae of similar length and placement. But that species has a sensillus with a slim, nearly setiform caput, with six lateral cilia, and also there are 'Anterior to the genital plate two forwardly directed projections on either side.' (Evans 1953: 260), as well as conspicuous granulation on the prodorsal quadrangular field.

Subgenus **Brachioppiella (Gressittoppia)** Balogh

Gressittoppia Balogh, 1983: p. 55.
Type-species (by original designation): *Brachioppia moresonensis* Kok, 1967.

Diagnosis (Adults)

Brachioppiella. Four pairs of genital setae.

Remarks

The subgenus *Brachioppiella (Gressittoppia)* was given this status by Subias & P. Balogh (1989), prior to which *Gressittoppia* was regarded by J. Balogh (1983) as a distinct genus in another subfamily (Cycloppiinae) compared to *Brachioppiella*, then included in the Pulchroppiinae. The distinction between the subgenera relies on the number of genital setae and this character exhibits intraspecific variation in *B.* (*G.*) *magna* sp. nov. (only one female has five pairs of genital setae, rather than the usual four pairs). Because of this, and because no other character state can be found to diagnose the subgenus, *Gressittoppia* and *Brachioppiella* may need to be regarded as synonymous as subgenera as well as genera. The position of the fissure *iad* being given importance here in defining families, means that similar species to *Gressittoppia*, like *Gressittoppia luxtoni* Ayyildiz, 1989, are excluded to another subfamily (Multioppiinae).

Brachioppiella (*Gressittoppia*) includes seven species (Subias & P. Balogh 1989) plus a further three new species described here from South Australia, the first records of the subgenus from Australia. The subgenus is widespread in southern temperate regions, with a few records from the far south (Tierra del Fuego and Antarctica). The three Australian species are as follows: *Brachioppiella* (*Gressittoppia*) *magna* sp. nov., *B.*(*G.*) *minima* sp. nov. and *B.*(*G.*) *pseudohigginsi* sp. nov..

Brachioppiella* (*Gressittoppia*) *magna sp. nov.
(Figs 3, 4, and 10)

Morphology

General appearance and dimensions: Body flattened and widened, dark red brown colour. Idiosomal length: female 498 (5, 480–520); male 412 (3, 362–463). Idiosomal breadth: female 212–229, male 174–206. Leg dimensions for holotype female (length 501): leg lengths (femur-tarsus) I–292, II–238, III–247, IV–307; tibial maximum breadth I–31, II–25, III–19, IV–22.

Prodorsum: Rostrum rounded, pale above ventral recess, with rostral setae dorsally ciliate. Quadrangular field with lamellar line nearly complete, whilst translamellar line with clear anterior margin to deep sulculus but posterior margin may be unclear in dorsal aspect, and posterior protruberance narrow and conspicuous with three pairs of alveolar, pale patches. Usually four large alveolar, pale patches lateral to quadrangular field. Only exobothridial seta is smooth, lamellar seta about 1.5 × length of interlamellar seta. Granulate area round exobothridial seta reaching profile to pedotectum I. Usually five, exceptionally four or six long cilia on caput of sensillus.

Notogaster: Nine pairs of medium length setae, sometimes inconspicuous dorsal cilia present, *c*2 represented by microseta. Seta *lm* nearly directly behind *la* and slightly nearer to it than to seta *lp*.

Somal venter: Epimere with strong alveolar sculpturing. In setal file *b*, all setae similar to those in file *c*. Apodeme *apo*4 reaching backward beyond level of posterior margin of genital shield. Pedotectum I profile granulate, small pedotectum 2 present, pedotectum 3 large and acute. Usually four pairs of genital setae, but one female with five pairs of genital setae. Anterior three pairs of genital setae short, seta *ge*4 longer. Aggenital seta longer than or subequal in length to adanal seta *ad*3.

Legs: Long (mean femur-tarsus length = 54% of soma length). Legs III and IV slim and relatively long so that leg IV longest and leg III third longest rather than shortest. Relative breadths of tibiae (maximum height: length): I = 57%, II = 43%, III = 31%, IV = 28%. Ventral setae on tibiae and tarsi (except *av*4 and *pv*4 on tarsus IV) ensiform and ciliate. On tarsus IV posteroventral setae *pv*1 and *pv*2 with cilia enlarged and fused at base so that fan-like.

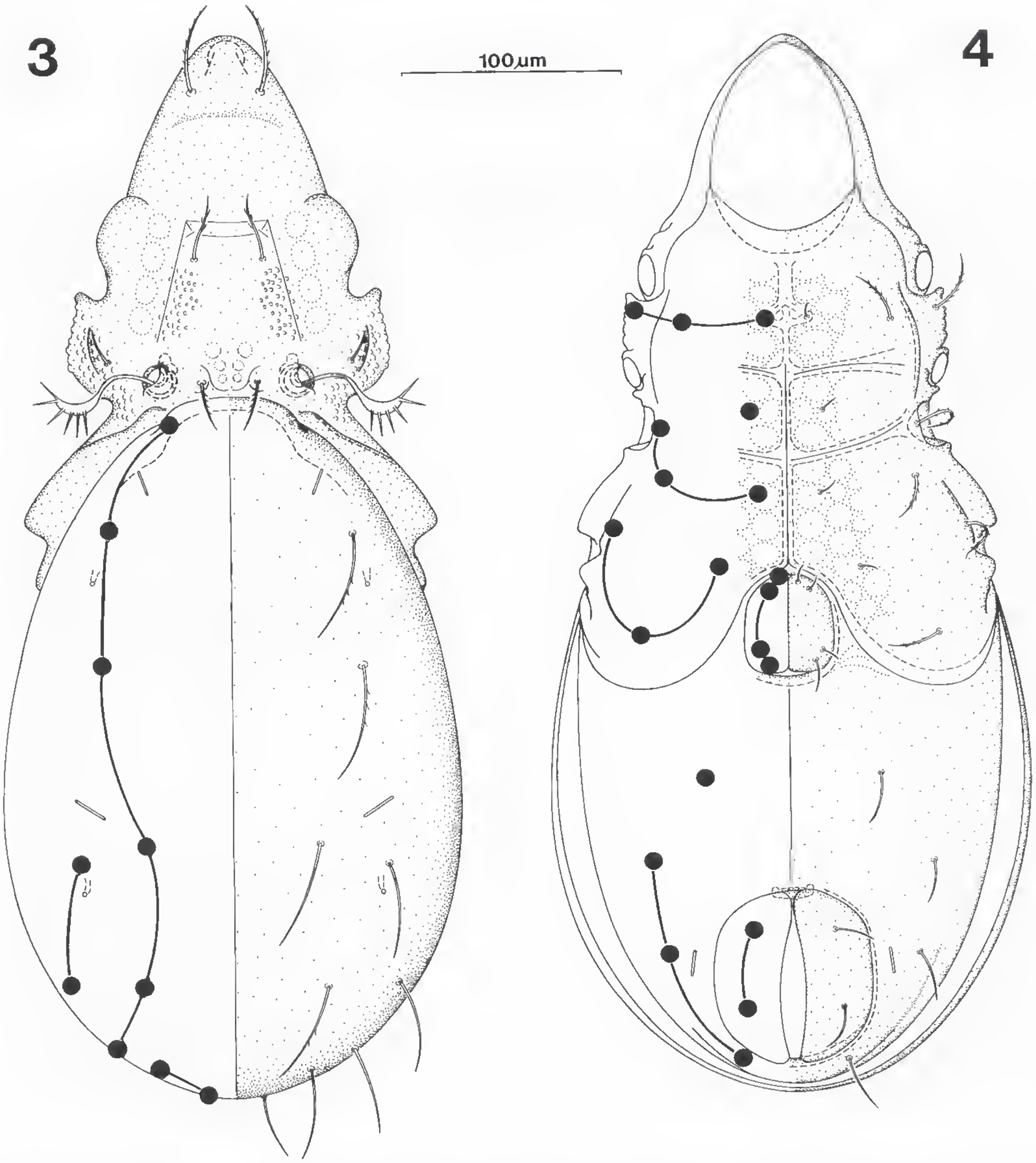
Material examined

Holotype: female (N1989334), plant litter, sparse moss and sandy soil, under sclerophyllous shrubs amongst messmate stringybark (*Eucalyptus obliqua*), dry sclerophyll forest, near summit of Mt Lofty (34°9′S, 138°5′E), Cleland Conservation Park, 9.v.1974.

Paratypes: 5 females (N1989335-N1989339) and 3 males (N1989340-N1989342); 1 female (FBUCM); same data as holotype.

Remarks

Brachioppiella (*Gressittoppia*) *magna* is variable in size, males being substantially smaller than females. The larger females are the largest within the genus, which is the basis of the species name derived from the Latin word *magnus* meaning 'large or great'. Possibly correlated with greater size are the dark colour, more extensive cuticular sculpturing and granulation, with more setae that are ciliate. *B.* (*G.*) *magna* is easily distinguished from other known Australian members of *Gressittoppia* by the backward extension of epimere 4 and the long leg IV, possibly functionally correlated character states. *B.* (*Brachioppiella*) *biseriata* (Balogh & Mahunka, 1975) from Queensland is large with a similarly extensive epimere 4 and disposition of the notogastral setae, so it may in the future be regarded as allied to this species, although they are currently in different subgenera. This possibility is more likely in the light of one female of *B.* (*G.*) *magna* having five pairs of genital setae, the extra pair making the disposition very similar to that of *B.* (*B.*) *biseriata*. But *B.* (*B.*) *biseriata* is further distinguishable as a separate species by



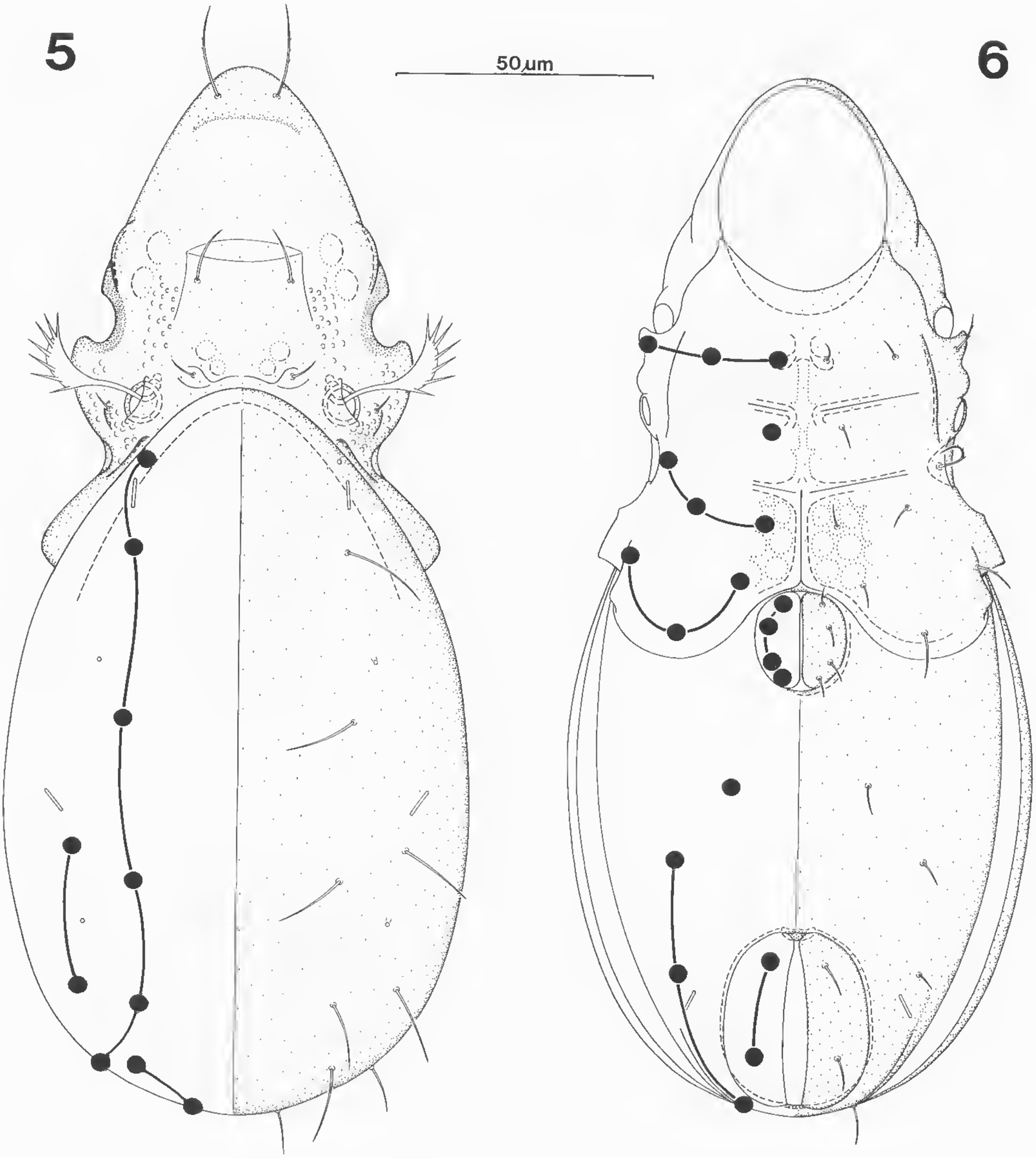
FIGURES 3 AND 4. *Brachioppiella* (*Gressittoppia*) *magna* sp. nov., female soma. 3, notum; 4, idiosternum.

having a number of shorter setae, in particular the interlamellar and aggenital setae and a slim caput to the sensillus. *B.* (*G.*) *magna* is also similar to *B.* (*G.*) *hartensteini* (Hammer, 1968), but the latter has a small seta *c*2 present, the caput of the sensillus is slimmer and notogastral seta *h*3 is anterior to pore *im*.

Brachioppiella* (*Gressittoppia*) *minima sp. nov. (Figs 5, 6 and 11)

Morphology

General appearance and dimensions: Body flattened and widened, straw colour. Idiosomal length: female 208 (28, sclerophyll forest, 200–217),



FIGURES 5 AND 6. *Brachioppiella* (*Gressittoppia*) *minima* sp. nov., female soma. 5, notum; 6, idiosternum.

200.5 (1, pine forest); male 198 (74, sclerophyll forest, 185-206), 192 (2, pine forest, 185-200.5), 190 (1, savannah woodland). Idiosomal breadth: female 78-87, male 85-95. Leg dimensions for holotype female (length 205.5): leg lengths (femur-tarsus) I-119, II-89, III-89, IV-98; tibial maximum breadths I-14.5, II-12, III-11, IV-12.

Prodorsum: Rostrum rounded, unstructured, with rostral setae dorsally ciliate. Quadrangular field with lamellar line restricted to anterior half of distance between lamellar seta and sensillus, translamellar line inconspicuous, sulculus shallow, margins may be unclear in dorsal aspect, posterior protruberance broad, flattened with two pairs of alveolar, pale patches. Usually two large alveolar pale patches lateral to quadrangular field. Lamellar, interlamellar and exobothridial setae fine and smooth, decreasing in size in this order, lamellar seta nearly 2 × length of interlamellar seta. Granulate area around exobothridial seta not reaching profile of pedotectum I. Usually six long cilia on caput of sensillus, may be additional one or two smaller proximal cilia.

Notogaster: Nine pairs of medium length smooth setae, subequal in length, seta *c*2 only represented by alveolus with root, but no seta. Seta *lm* nearly directly behind *la* and midway between it and seta *lp*.

Somal venter: Epimeres with weak alveolar sculpturing. In setal file *b*, setae 1*b* and 3*b* like file *a*, whilst 4*b* is as long as setae in file *c*, but smooth, without cilia. Apodemes absent between epimeres 1 and 2, although linear surface sculpturing present. Pedotectum 1 profile smooth, no pedotectum 2, pedotectum 3 large with acute point. Genital setae short and subequal in length. Aggenital seta subequal in length to adanal seta *ad*3.

Legs: Medium length (mean femur-tarsus length = 48% of somal length). Legs I and IV longer than other legs, leg II being as short as leg III, but as broad as leg IV. Relative breadths of tibiae (maximum height: length): I = 57%, II = 66%, III = 45%, IV = 48%. Tibia IV shorter than tarsus IV, caput broad, more than 2.5 × breadth of stalk. Ventral setae on tarsi II-IV often ensiform and ciliate, but not on tibiae. On tibia IV, seta *av* longer and stouter than *pv*, but still setose and similar to *d*2 on tarsus IV.

Material examined

Holotype: female (N1989343) plant litter, sparse moss and sandy soil, under sclerophyllous shrubs amongst messmate stringybark (*Eucalyptus obliqua*), dry sclerophyll forest, near summit of Mt Lofty (34°9′S, 138°5′E), Cleland Conservation Park, 9.v.1974.

Paratypes: 19 females (N1989344-N1989362) and 66 males (N1989363-N1989428); 2 females and 2 males (FBUCM); 2 females and 2 males (FMNH); 2 females and 2 males (NZAC); same data as holotype. One female (N1989429) and two males (N1989430, N1989431), pine litter and sandy soil, under pine trees (*Pinus pinea*), cultivated forest, Knott Hill (35°12′S, 138°41′E), Kuitpo Forest Reserve, 22.v.1974. One male (N1989432), grass, moss, leaf litter and loamy soil under manna gum trees (*Eucalyptus viminalis*), savannah woodland, Chambers Gully (34°59′S, 138°41′E), Cleland Conservation Park, 12.vi.1974.

Remarks

Brachioppiella (*Gressittoppia*) *minima* is the smallest known species in the genus, which is the basis of the species name derived from the Latin word *minimus* meaning 'least'. It is similar to *Brachioppiella* (*Gressittoppia*) *pepitensis* (Hammer, 1962), a slightly larger species (length 270) from Tierra del Fuego. *B.* (*G.*) *pepitensis* differs in minor ways in the disposition and shape of setae as follows: sensillus with nine or ten cilia, hysteronotal seta *la* closer to *lm* than *c*2, adanal seta *ad*2 posterior to pore *iad*. Although some cuticular markings are stronger, the apodeme between epimeres 1 is absent posterior to seta 1*a*, suggesting a close relationship of *B.* (*G.*) *pepitensis* to *B.* (*G.*) *minima*, even though the shape of its tibia and tarsus IV is normal for the genus (similar to *B.* (*G*). *pseudohigginsi* sp. nov., Fig. 12) and unlike that of *B.* (*G.*) *minima* (Fig. 11). The correlation of the reduction in mid-sternal apodemes and the shape of the leg segments and their ventral setae characterizes *B.* (*G.*) *minima*.

Brachioppiella* (*Gressittoppia*) *pseudohigginsi sp. nov.

(Figs 7, 8 and 12)

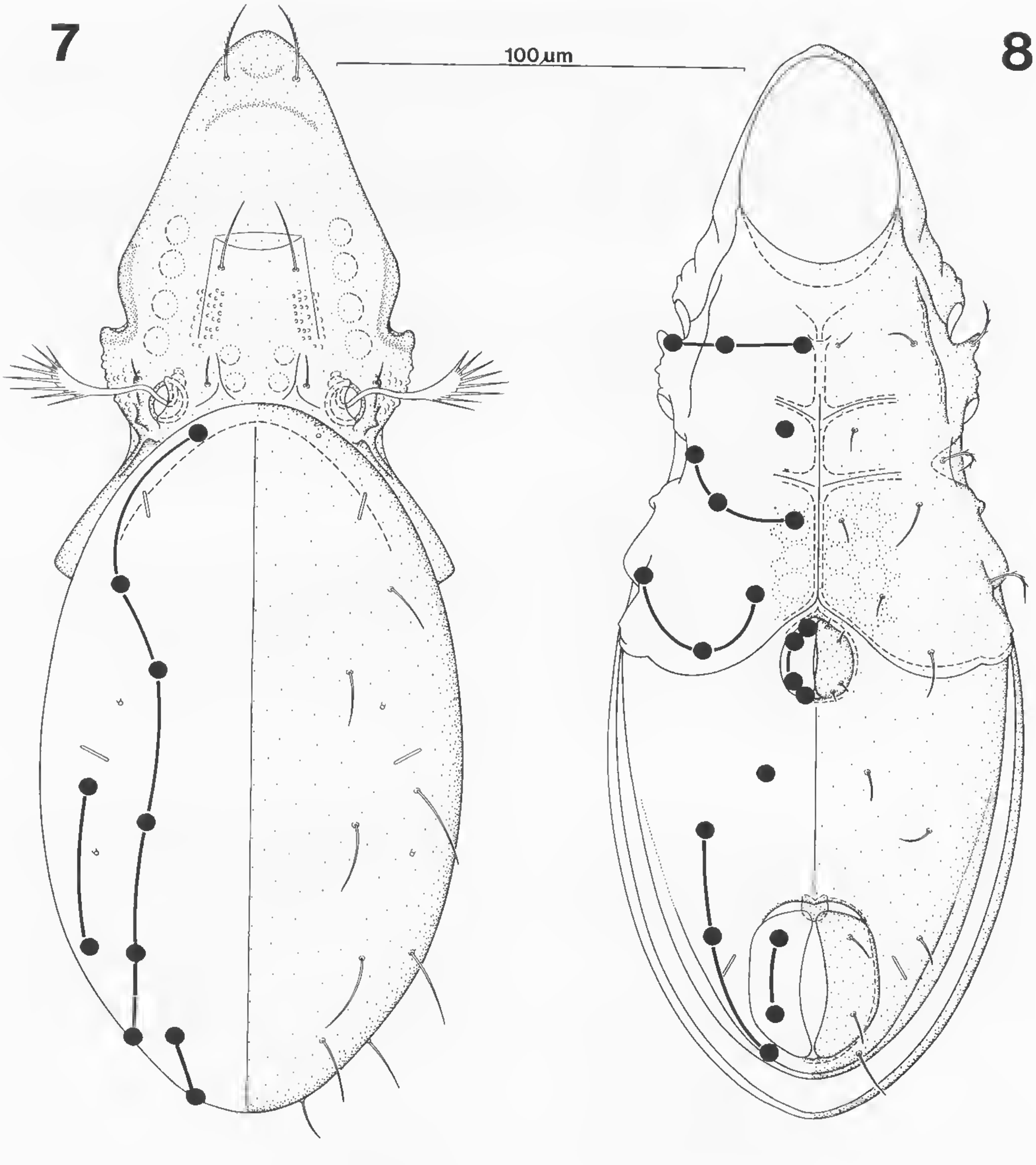
Morphology

General appearance and dimensions: Body flattened, broad for female, elongate for male, brown colour. Idiosomal length: female 295, male 275. Idiosomal breadth: female 117, male 112. Leg measurements for holotype male (length 275): leg lengths (femur-tarsus) I–156, II–118, III–109, IV–139; tibial maximum breadths I–18, II–14.5, III–12, IV–12.

Prodorsum: Rostrum round, unstructured except slight concavity between dorsally ciliate rostral setae. Quadrangular field with lamellar line nearly complete, translamellar line with moderately deep sulculus, but margins may be unclear in dorsal aspect, and posterior protruberance broad with two pairs of alveolar pale patches. Four large alveolar, pale patches lateral to quadrangular field. Lamellar, interlamellar and exobothridial setae fine and smooth, decreasing in size in this order, lamellar setae more than 2 × length of other setae. Granulate area around exobothridial seta reaching profile of pedotectum 1. Six or seven long cilia on caput of sensillus.

Notogaster: Nine pairs of short to medium length smooth setae, *la* and *lm* being short, seta *c*2 represented only by alveolus with root, but no seta, just behind pore *ia*. Seta *lm* behind and closer to seta *la* than to *lp*.

Somal venter: Epimeres with weak alveolar sculpturing. In setal file *b*, seta 1*b* shorter than 1*c*, whilst 3*b* and 4*b* similar in length to 3*c* and 4*c*, but all smooth lacking cilia. Apodeme *apo*4 reaching backward to level of mid-genital shield. Pedotectum 1 profile granulate, no pedotectum 2, pedotectum 3 large and blunt. Genital setae short and subequal in length (*N.B.* male illustrated, Fig. 8, so plates appear relatively small compared to other species where females illustrated). Aggenital seta subequal in length to adanal seta *ad*3.



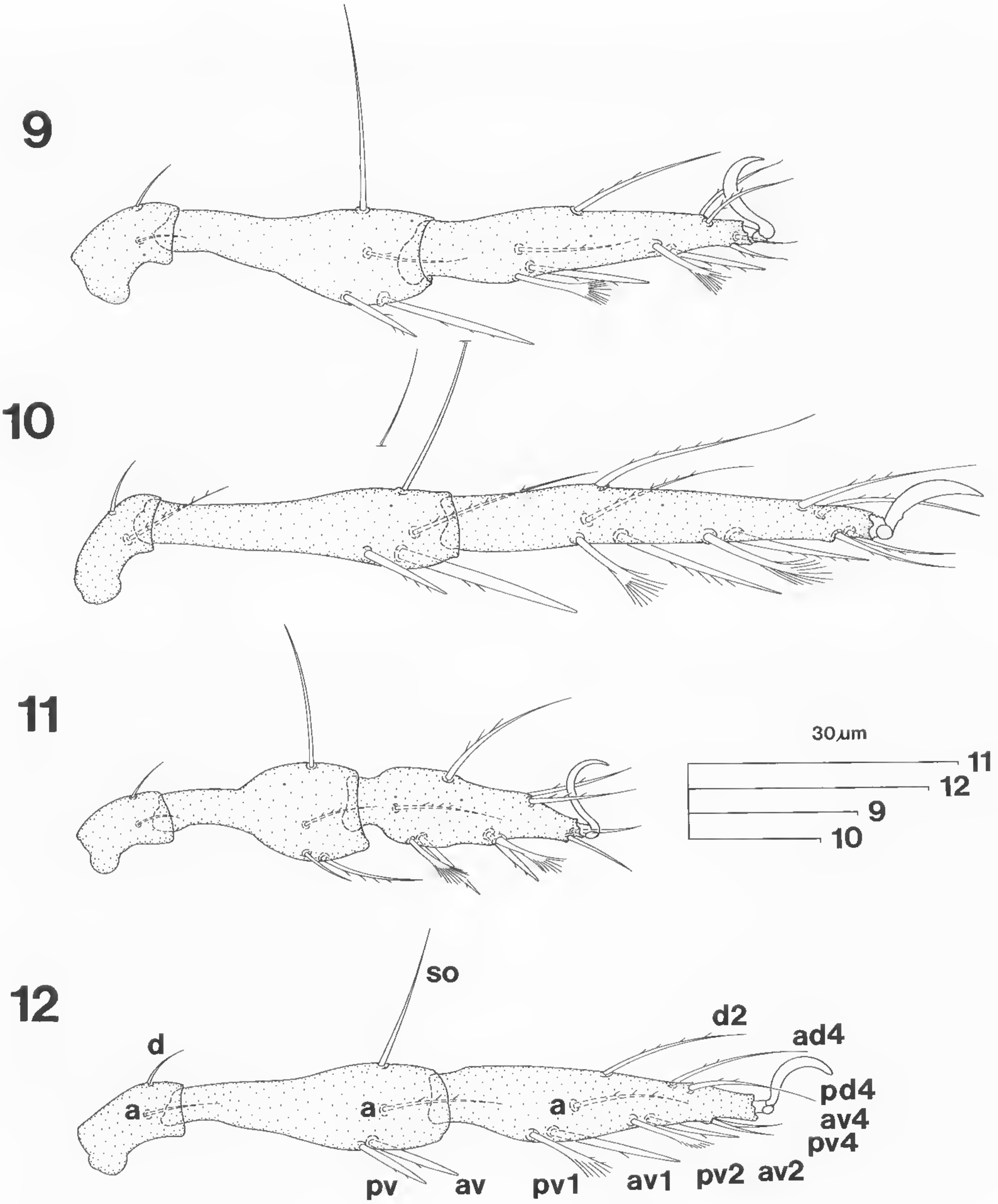
FIGURES 7 AND 8. *Brachioppiella* (*Gressittoppia*) *pseudohigginsi* sp. nov., male soma. 7, notum; 8, idiosternum.

Legs: Medium length (mean femur-tarsus length = 47% of somal length). Legs I and IV longer than other legs, whilst legs I and II are stouter than other legs. Relative breadths of tibiae (maximum height: length): I = 54%, II = 55%, III = 45%, IV = 33%. Tibia IV shorter than tarsus IV, caput medium breadth, slightly less than 2 × breadth of stalk. Ventral setae on tibiae and tarsi often ensiform and ciliate. On tibia IV, ventral seta *av* only slightly longer than *pv* and shorter than *av*l on tarsus IV.

Material examined

Holotype: male (N1989433), plant litter, sparse grass and calcareous sandy soil, under coastal wattle (*Acacia sophorae*), coastal closed scrubland, just south of main pond (38°03′S, 150°57′E), Piccaninnie Ponds Conservation Park, 3.vii.1974.

Paratype: female (N1989434); same data as holotype.



FIGURES 9-12. *Brachioppiella*, posterior aspects of genu, tibia, tarsus, pretarsus of right leg IV. 9, *B.* (*B.*) *paranasalis* sp. nov.; 10, *B.* (*G.*) *magna* sp. nov.; 11, *B.* (*G.*) *minima* sp. nov.; 12, *B.* (*G.*) *pseudohigginsi* sp. nov. Key: a = anterior, d = dorsal, p = posterior, v = ventral, so = solenidium.

Remarks

Brachioppiella (*Gressittoppia*) *pseudohigginsi* is very similar to *Brachioppiella* (*Brachioppiella*) *higginsi* (Hammer, 1968) from New Zealand in the disposition and shape of the notal setae, which is the basis of the species name derived from the Greek word *pseudos*, meaning 'lie', and *higginsi*. *B.* (*B.*) *higginsi* has a slimmer caput to its sensillus and has five pairs of genital setae, which places it in the nominate subgenus. *B.* (*G.*) *pseudohigginsi* is also similar to two larger species from South Africa: *B.* (*G.*) *moresonensis* (Kok, 1967), length 300-344, and *B.* (*G.*) *orkneyensis* (Kok, 1967), length 330-380. *B.* (*G.*) *moresonensis* differs in that notogastral seta *h*3 is positioned well forward, anterior to fissure-like pore *im* rather than posterior to it (Fig. 7). *B.* (*G.*) *orkneyensis* differs in that seta *av* on tibia IV is twice as long as seta *pv* and acutely tapered rather than shorter and stouter (Fig. 12).

RESUMEN

Como parte del estudio de los ácaros oribátidos de suelos del sur de Australia, se discute el género *Brachioppiella* Hammer, 1962, y se describen las cuatro nuevas especies siguientes: *Brachioppiella* (s. str.) *paranasalis* sp. nov., *Brachioppiella* (*Gressittoppia*) *magna* sp. nov., *B.* (*G.*) *minima* sp. nov. y *B.* (*G.*) *pseudohigginsi* sp. nov.. También se discute la subfamilia Brachioppiinae Subias, 1989 y se dan unas claves de géneros, subgéneros y especies australianos.

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